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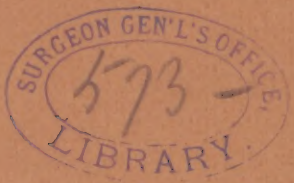
METRITIS AS A CAUSE OF MISCARRIAGE

BY

CHARLES GREENE CUMSTON, B. M. S., M. D.

BOSTON, MASS.



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METRITIS AS A CAUSE OF MISCARRIAGE.[1]

BY CHARLES GREENE CUMSTON, B.M.S., M.D.,
Instructor in Clinical Gynecology, Faculty of Medicine, Tufts College; Member of the Société Française d'Electrothérapie, etc.

LECTURE I.

GENTLEMEN: — You have seen at my clinics a number of cases of metritis in all its various forms, and you have noticed how many of these patients have had miscarriages. It is for this reason that I would like to devote a few lectures to this important subject, particularly as it is just this class of cases the general practitioner is called upon to treat; and a knowledge of this subject will certainly be of value to you in your practice hereafter.

It is necessary, in order to have a good idea of what is to follow, that I should put before you a few of the generalities of the pathology of abortion.

Abortion is the expulsion of the product of conception before the fetus is viable, in other words, before the end of the sixth month of gestation.

The important writings of Garimond and Jacquemier demonstrated the real etiology, and the rapid progress of medical science has little by little excluded the so-called spontaneous abortions; and I think it is safe to say that there is not such a thing as a spontaneous or idiopathic miscarriage. As the great Barnes says, an abortion indicates that there is a disease, or that the organism is overworked. A healthy woman, well built, and who has conceived from a healthy man, aborts with great difficulty.

[1] Being four Clinical Lectures delivered at the Suffolk Dispensary, Boston.

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Theoretically and practically, the causes of abortion are *predisposing* and *determining*. The immediate or effectual cause in all cases is the contraction of the uterus, which may be produced by external or internal irritation.

To the first order belong traumatism, heat, cold, electricity, nervous emotions, etc. You should put little faith in what a woman or her friends say regarding a slight fall, a slip, jar of a carriage, a disagreeable smell or anger, as a cause of abortion. Medical literature is full of cases in which pregnant women have received bad shakings-up, falls from quite a distance, wounds, and even severe operations (such as laparotomy), without interrupting the progress of pregnancy. Cazeaux mentions the case of a woman who threw herself from a third-story window, fractured her arm, and had a normal labor at term.

In the ordinary conditions of health, pregnancy is well protected against the most various accidental influences, and the cause of the habit of easy abortion must be looked for elsewhere. As Barnes says, a healthy uterus is not at the mercy of an emotional or diastalic accident; but it is in no way doubtful, I think, that very violent external irritations may produce an abortion, especially in nervous subjects.

Physical irritations almost always act by a partial separation of the placenta from the uterine wall, by the rupture of some vessels, or simply by producing a congestion of the uterus, which may subside or terminate in a short time by a utero-placental hemorrhage. If the extravasation is of sufficient extent to suddenly destroy functionally a considerable portion of the placenta, the fetus dies at once, and very probably the commotion that is received by the uterus produces contractions which detach and expel the ovum.

It sometimes happens, however, that even when

there is a considerable extravasation, the embryo does not die; the ovum is detached, and is then expelled with a living embryo.

There are cases, gentlemen, in which a jar will directly produce an excito-motor action of the uterus, or in others death to the fetus. External violence may act directly over the region occupied by the uterus, and wound the fetus. Severe or sudden mental shocks act by means of the nervous system of the woman by directly producing uterine contractions, with death to the embryo, or by causing a congestion of the uterus and utero-placental hemorrhage.

Although uterine contractions may be set up by external irritation some distance from the genital organs, the most important and dangerous are certainly the *internal* irritations which act on the internal aspect of the uterus. You all are aware that foreign bodies introduced into the uterine cavity will cause abortion. As in the above-mentioned irritations, the uterus contracts by a reflex action; but the starting-point of this reflex is the uterus itself, and not in other parts of the organism.

To this category of internal irritation belongs the exit of blood from the vessels, and even the ovum, in certain cases. The hemorrhages which occur at the surface of the ovum come from the chorion or the placenta, and may provoke a premature labor, not only resulting in the death of the fetus, but also by irritating the internal aspect of the uterus, starting up contractions.

According to Garimond, if the collection of blood is situated between the chorion and the uterus, the muscular fibres show their irritation by contracting, the hemorrhage acting like a foreign body; but it is tolerated when it accumulates in the interior of the ovum. If the ovum is detached, with or without a collection of blood, it acts in the same manner, because

the friction that it produces on the interior of the uterus excites the nerves of the organ, thus producing the labor pains.

Now, as to the cause of the death of the fetus, the question is not fully settled. The majority of the French and German authorities admit that the fetus, when once dead, acts like a foreign body, and after a variable time starts up uterine contractions which expel the ovum. But there are some of the present German obstetricians who are opposed to this theory, and give the following explanation in its stead. The dead fetus does not play the part of a foreign body; its action on the contractions is of an entirely different nature. With the arrest of development of the ovum, the stimulant of the growth and proliferation of the muscular fibres of the uterus ceases. Now, if the death of the embryo takes place slowly, the same process will occur in the uterine tissue; there is consequently arrest of the reflex growth of the muscular tissue of the uterus, or, as may be admitted, the usual relaxation of the organ is no longer in a favorable condition, while the muscular fibre having stopped growing must in time contract. Thus, according to this theory, it is not the foreign body but the disappearance of the cause that brings about labor, namely, distention of the uterus and absence of contractions.

Although this theory is ingenious and is in accord to a certain degree with the hypotheses regarding muscular contraction, Rouget's theory is certainly of doubtful value, and is as follows: anything which prevents the work of nutrition of a muscle causes the tendency of lengthening of the fibres to disappear, while the elasticity remains alone in play, and contraction is the result. As is pointed out by Zielinski, it would appear to me that in this theory there is a confusion of *contractility* and *retractibility* which are two very different properties of the uterine muscle.

The most plausible explanation of the action of the dead fetus is probably that given by Barnes: After the death of the fetus (if this is the first act) death of fetal and maternal placenta and the envelopes comes on progressively, the vascular connections between the uterus and placenta are cut off, and the uterus being no longer stimulated to growth, takes on the condition of a non-pregnant organ. There is involution, the circulation of blood becomes less active, the muscular tissue undergoes fatty metamorphosis, and the whole organ decreases in size. At the same time the chorion undergoes an involution of the same nature. The end of this mucous involution is exfoliation or detachment. Once this separation is accomplished the ovum is free in the uterine cavity, and is now only a foreign body. When the uterine retraction, which accompanies involution, has reached a certain point, the dead ovum comes in contact with the retracted uterine walls, and the retraction, which up to this time was only passive and atrophic, is replaced by active muscular contractions, produced by reflex action.

To internal irritations capable of producing miscarriage, I might add distention of the uterus. This may be caused by an abnormally large ovum, as in twins, hydramnios or other similar conditions, which act on the entire internal surface of the uterus by producing over-distention of the muscular fibres of the organ. On the other hand, the ovum may be normal, but the walls of the uterus are limited in development by loss or decrease in their elasticity.

In both conditions, the extreme distention of the uterus is sometimes sufficient to cause premature contractions and thus interrupt the progress of pregnancy. It is probable that in metritis the coexistence of lesions of the endometrium and muscular tissue is constant. According to de Sinéty, Courty and Schroeder, inflammation of the endometrium rapidly invades the paren-

chyma of the organ, resulting in metritis and parametritis.

No matter what may be the etiological factor, the nature or primary seat, the inflammatory process invades the neighboring tissues by way of the lymphatics, veins, connective-tissue elements — from the endometrium to the parenchyma of the uterus and periuterine tissues. But in most of the cases, you will find the lesions will predominate in some one part of the organ, as the endometrium or uterine parenchyma: consequently pathologists have classified inflammations of the uterus into two groups, endometritis and parenchymatous metritis.

The same division is to be made in the pregnant woman, because the endometrium here plays the all-important part; and as I have already mentioned in another lecture[2] the adhesions between the decidual and the muscular tissue of the uterus becomes less and less intimate as gestation progresses. Parenchymatous metritis is not so important a factor in the etiology of abortion as is endometritis, its influence being of an entirely different kind.

I shall only speak of the chronic metrites, which are far better understood than the acute types. Inflammation of the endometrium may invade any of the three deciduæ, the decidua vera, reflexa and serotina. In each case, the histological process is the same; it is either an interstitial endometritis, consisting of an infiltration of small embryonic cells, often arranged in rows, according to Veis, as well as a proliferation or alteration of the decidual cells; or else it is a glandular endometritis, which is a hypertrophy and hyperplasia of the uterine glands; and lastly, it may be a mixed endometritis, with or without vascular lesions.

According to the nature of the lesions, the changes

[2] Hemorrhagic Metritis. International Clinics, Fourth Series.

in the decidua vera present different anatomical characters.

In *hyperplastic endometritis* the decidua is thickened to even double the normal, and continues to increase as it comes nearer to the fundus. This hypertrophy is often uniform and regular, giving the surface of the mucosa an even and smooth appearance. Interstitial inflammation predominates in this type and may go as far as real sclerosis and even to formation of abnormal adhesions. Hemorrhages occur quite often. Kascheworowa found muscular fibres in parts of the mucosa nearest to the uterine walls.

In the *tuberous endometritis*, also called *polypoid*, instead of an even hyperplasia as in the preceding type, the decidua presents numerous projections, which may attain to a centimetre and a half in height. They are rather irregular, generally pedunculated, and look like polypi. Those which are sessile take on various shapes like folds, nodosities, bands, etc. These inequalities are usually very vascular and are made up, according to Dohm, Spiegleberg and Mars, of large decidual cells. Tarnier and Budin, when writing in 1888, said that in all the cases reported up to that date, pregnancy had not gone beyond the fourth month. The development of the ovum was very much interferred with or else hemorrhage occurred and produced abortion.

Cystic endometritis, as its name indicates, has for pathological changes the development of numerous cysts in the midst of the decidua. These cysts vary in size from that of a pea to a walnut and contain a colloid substance. The surrounding parts of the decidua are in a state of hypertrophy and small hemorrhagic foci are to be found. This cystic degeneration is in some cases so pronounced that it might be mistaken for an hydatidiform mole. Leopold, Winckel and Veit believe that the cysts are produced by the

distention of the uterine glands, which are filled by their retained secretions. Maslowsky examined two deciduæ from a woman who had three abortions in one year, all occurring at the end of the second month, and found that in both specimens the decidua was riddled with small cysts which were partially lined on their interior by a glandular epithelium.

The production of *catarrhal endometritis* is due to the inflammation, hypertrophy and over-activity of the uterine glands. When the decidua is irritated and in a condition of hyperemia, these glands, which are now generally regarded as filters and not organs of secretion, filter the excess of liquid which they receive from the neighboring capillaries. There then form between the decidua vera and reflexa what may be termed *hydrorrheic pockets*, with the result that these deciduæ, which are united at the end of the third month of gestation, remain separated. I believe that it is quite safe to say that an endometritis can be the cause of a decidual hydrorrhea; but all writers do not consider it as the only factor in the production of a watery discharge.

Hemorrhagic endometritis was the subject of a clinic given here some time since, and I shall be brief. Winckel has termed this affection as apoplexy of the decidua, which is in a condition of hypertrophy with dilated vessels, while extravasation of blood is to be found both at the internal and external aspect. Budin has reported a very demonstrative case in which there was a hemorrhage of the decidua some distance from the placenta, while on the decidua, which was hypertrophied, were some vessels, which near the clot were dilated and moniliform, such as are met with in neo-membranes.

Purulent endometritis is a very rare form, only a few cases having been reported. It is simply a purulent infiltration of the decidua and also in some cases

the chorion. The starting-point is probably an inflammation of the decidua vera.

Now, gentlemen, it is very infrequent to meet with a case in which *one* of the above-mentioned forms is perfectly typical; generally they are combined, for example, a hyperplastic will be found accompanying a polypoid endometritis and then we have the *mixed* variety.

Inflammation is much less likely to invade the decidua reflexa, because atrophy takes place much earlier in this than in the decidua vera, the regressive metamorphosis beginning after the first month of gestation; and Veit states that he has never seen a characteristic interstitial inflammation of the decidua reflexa. It is only in catarrhal endometritis that it really plays an important part. However, there are some recorded cases in which the decidua reflexa was found thickened, and although very rarely, hemorrhages in its substance were noted, while Dohm has even reported a case of polypoid endometritis.

Now, if you carefully examine the expelled products of a miscarriage and on the external aspect of the chorion you find a quantity of rather friable yellowish tissue, you must be very careful not to at once make a diagnosis of endometritis, because this mass of tissue, which undoubtedly may be the decidua in a state of hypertrophy, may also be simply fibrous clots of a yellow or whitish color and easily recognized by their stratified aspect. Consequently, you should make a microscopical examination, which will remove all doubts.

The important changes of the decidua naturally affect the other membranes of the ovum. The chorion may be very thin and friable, while its villosities may develop irregularly and undergo a fibro-fatty, or even myxomatous, degeneration. The amnios may be only slightly united to the chorion or may even be separated from it by a sanguineous collection. The amni-

otic liquid becomes opaque, brown and sometimes even bloody. Consequently, you will keep in your minds these secondary lesions of the membranes which show their changes by partial detachment or adhesions. If the inflammatory lesions are only seated in the decidua serotina, you have to do with placental endometritis, which presents the same types as decidual endometritis, so I will not repeat them here.

As to their histology, I shall use the classification of Zinowieff, who has made some remarkable studies on the pathology of the placenta in abortion.

First, we have pathological changes in the placental vessels with troubles in the circulation, among which may be mentioned, as the most important, intra-placental hemorrhages, circumscribed or diffused, and a periarteritis of the placental vessels which produces a diminution in their calibre and a fatty degeneration of the villosities.

Secondly, a proliferation of connective tissue, which forms the so-called diffused or circumscribed interstitial placentitis.

Thirdly, changes in the decidual cells and villosities, which consist in a colloid, fatty, granular, hyalin, or fibro-fatty degeneration, with atrophy and change in shape and size of the villosities.

To this last, belongs the four cases of abortion reported by Colucci. They all took place between the tenth and fifteenth week. The villosities of the fetal placenta presented a hypertrophy of their epithelial membrane and an atrophy of their connective tissues. These changes coincided, according to this writer, with an endometritis. Veit, Winckel and others admit that a placental endometritis is often the cause of white infarction, and always that of a placenta marginata, the latter always being, according to Veit, a characteristic sign of endometritis.

A decidua serotina endometritis may result in a hy-

pertrophy or adhesions of the placenta, these being usually partial, seldom total. Hypertrophy of the placenta is easily recognized by a careful inspection of the specimen. Its increased size and weight, in relation to the size of the fetus and the duration of pregnancy, are also quickly estimated. As to partial or total adhesions which are commonly met with in practice, they play an important part, of which I shall speak later.

Chronic parenchymatous metritis is generally of old standing; the uterine muscle has lost its elasticity; while the predominating histological change is a proliferation of the connective tissue with resulting sclerosis. The muscular fibres, which in the beginning were in a state of hypertrophy, softened and red, atrophy, become hard to the feel, and take on a whitish color. These changes are due to an embryonic proliferation occurring around the vessels. When the uterine parenchyma has been acted upon by an inflammatory process of long duration, it is infrequent if there is not at the same time some remains of a perimetritis with adhesions producing deviations of the organ and traces of salpingitis. The uterine mucosa is *always* more or less diseased.

The question now comes as to how metritis produces abortion and I will try to demonstrate this problem to the best of my power. The uterine mucosa is a soil more or less fertile, in which the ovum may grow and develop, or perish. If it is badly diseased, it is unsuited to hold the impregnated ovum; but if the endometritis is not very severe or generalized, the ovum grafts itself on to it, develops and may go to a full term; however, it is more frequent to meet with an interrupted gestation sooner or later in these cases. The consequences are the same for both mother and fetus when an inflammation of the decidua takes place during gestation, and its influence

on the evolution of the ovum is always of the worst. Endometritis, and metritis in general, bring about sterility or various complications during gestation, labor or the post partum. The difference depends on the severity, the nature, the condition of the patient and other factors which are sometimes difficult to make out. The miscarriage in these cases is only one of the symptoms of endometritis, but by far the most important and frequent.

It may occur in several ways which I will now consider:

By the death of the fetus. Following the changes in the decidua produced by the endometritis, the villosities of the chorion become diseased, while the underlying structures become so in their turn until the ovum is also in a pathological condition. On account of repeated congestion, friability and rupture of the vessels, the decidua may also become the seat of extravasation of blood which compresses and alters the villosities of the chorion, resulting in the abolition of their functions and reducing the decidua serotina to a condition of uselessness, with death to the fetus and later its expulsion from the uterine cavity.

The second manner of miscarriage is by detachment of the ovum. If a hemorrhage suddenly occurs in the decidua vera or serotina, or if it is considerable in amount, it produces a detachment of the ovum which is followed immediately or in a few days by a miscarriage. Hydrorrhea produced by a catarrhal endometritis acts in the same manner. When the liquid is suddenly expelled in considerable quantity, the sudden decrease in size of the uterus may produce a detachment of the ovum and contractions of the organ.

Hyperplasia of the decidua, especially the serotina, often exercises its bad influence on the fetus by cutting off its nutrition. The connective tissue or a

proliferation of embryonic cells around the villosities and the cotyledons which are thus more or less encroached upon, produce a diminution in the calibre of the vessels and a fatty degeneration of the villosities, while the fact that healthy parts of the placenta become more and more reduced in extent, soon act on the fetus, which finally dies. Now, a sclerous hyperplasia of the decidua or an induration of the placenta may also produce a miscarriage by loss of elasticity of its tissues, which can only follow the growing uterus with difficulty, and there finally comes a time when a partial detachment takes place.

The third manner of miscarrying is by rupture of the membranes. As I have already said, the pathological condition of the decidua may act on all the membranes; and when they are badly nourished, they become friable and break by the least movement. This is enough to show you how premature rupture occurs, with a resulting miscarriage or premature labor. Sometimes an inflamed decidua, by modifying its nutrition, increases the irritability of the uterus to such an extent that the normal development of the ovum is enough to bring on painful contractions which usually expel the ovum. In this case, the miscarriage is not preceded by either detachment of the membranes or death of the fetus. As to endometritis of the cervix, when there is much secretion, the spermatozoa cannot enter the cavity of the uterus on account of the mechanical obstruction produced by the plugs of mucus in the canal. But cervicitis can also cause miscarriage, and Whitehead believes that 73 per cent. of miscarriages are provoked by diseases of the lower segment of the uterus. Barnes believes that although the cervix has no direct relation with the ovum, its connection with the corpus uteri is sufficiently intimate for a severe cervical hyperemia to produce considerable afflux of blood and nervous disorders in the body of

the organ. An extravasation of blood, with miscarriage may result.

As I have already remarked, in chronic parenchymatous metritis, after perivascular embryonic proliferation and ultimate sclerosis, the uterine walls lose their natural elasticity and can no longer dilate as the ovum increases in size. In consequence of this rigidity, the organ can only tolerate the ovum up to a certain time; and when the germ has developed to a size which distends the uterine walls to their limit, contractions begin and determine the miscarriage. As parenchymatous metritis is of long duration, miscarriages may occur often and usually at about the same time of gestation on each occasion, because the walls can only be distended just so far. Leopold thinks that this metritis is quite sufficient explanation for repeated miscarriage in many cases; and a case is mentioned by Bick of a woman having a chronic metritis, and who aborted twenty-four times, always at the third month of pregnancy.

I have seen many cases of endometritis and metritis, in whom sterility was present, or who could never carry their pregnancies further than the first three or four months. In many of them labor at term was brought about by proper surgical treatment of the diseased uterus.

I have now finished with the pathology of miscarriage, and in the next lecture I shall take up the various forms of metritis and their relations to abortion.

Lecture II.

Gentlemen: — In this lecture, I propose to study the different varieties of metritis that produce miscarriage. The subject is a long but interesting one, and I trust that you may find it so.

According to the modern theories, it may be said that all inflammations of the uterus are of infectious origin. It is now a long time since Schroeder put forth this idea; but it was not generally accepted until the writings of Steinschneider and Winter on gonorrhea, and those of Goenner, Doederlein, Straus, Sanchez Toledo, Peraire and Widal on puerperal fever had appeared. The most frequent infection is either exogenous or hetero-infection by germs coming from without. It is also an established fact that in some cases, more infrequent however, the infection comes from the uterus or vagina, in which case you have a real auto-infection. In the healthy female, the vagina affords a home to a host of virulent bacteria which enter into action whenever favorable circumstances are present, as, for example, any *débris* that may remain *in utero* after a labor or miscarriage.

According to the part attributed in the etiology of the abortion, the metrites may be divided into two groups. The first have an undoubted and marked influence in predisposing patients to abort; these are puerperal and gonorrheal infection. Those of the second group are not so characteristic in the production of miscarriage, either on account of their nature or the degree of their influence on interrupting pregnancy. In this class I include syphilis, tuberculosis and the general infectious diseases.

We will now proceed to the study of each one separately, and will begin with puerperal metritis. It is now generally admitted that a great number of metrites have their origin in a septic inflammation brought on by a labor or miscarriage, and have for their agent the streptococci coming from the vagina, and usually brought from without by means of unclean instruments or hands.

After labor, the uterus even when normal, or after an abortion, presents a most favorable soil for culture

to all infectious bacteria. At the same time the organ is in a particular condition of hyperplasia and congestion, which demands certain special hygienic conditions in order to progressively disappear. Now, these conditions are unfortunately very often neglected, and it is for this reason that post-puerperal metritis is so frequently met with. It occurs especially when the labor or miscarriage, as the case may be, has been abnormal, and may continue forever in a chronic form if an antiseptic treatmeat of the most rigorous kind is not immediately put into action. As after labor, there is only a thin layer of mucosa made up of a stratum of young cells, and the bottoms of the glandular culs-de-sac are widely open, it is evident that an infection which is deep in its origin, will remain deep.

In post-partum endometritis, if the uterine muscles contract promptly, thus reducing the surface of the cavity of the organ, the mucosa is massed together, giving it the appearance of thickness, and little by little during reparation, it will enclose in its depth the tissues primitively invaded by septic inflammation, and a chronic condition is set up from the beginning, This metritis often produces sterility; but you must not think for a moment that conception or pregnancy is not possible in these cases. However, it is exceptional that labor takes place normally or at term, and from my observation, miscarriage is extremely frequent, and I do not hesitate to say that metritis is the cause of the greatest number of abortions.

I must not forget to mention, as an important factor in the production of endometritis post-partum, the too hasty getting up of the patient after labor. It is a hard matter to decide what pathological type a post-partum endometritis due to infection will assume. I have met with many varieties, most generally diffused, with tendency towards the plastic, catarrhal or hemor-

rhagic types, although I am inclined to believe that the latter only occurs when there remains some *débris* of the decidua in the uterine cavity after an abortion, and that in this case there is no infectious process.

Beside puerperal metritis, there are other metrites which occur after attenuated septic conditions, and probably have their starting-point in the vagina, in which altered secretions or the blood of menstruation form the culture media for the development of the pathogenic agent; and a traumatism or severe congestion which causes a disturbance or lesion of the lining epithelium will start up an inflammatory process that rapidly extends over the entire mucosa. This form of metritis will also facilitate miscarriage.

We now come to the important subject of gonorrheal metritis; and although it is only recently that this type of uterine inflammation has been admitted by pathologists, still Barnes and Schroeder taught that gonococci infection played an important part in the etiology of miscarriage. Richard and Bousquet consider it as very frequent. The uterus is a more favorable medium for the growth of Neisser's organism than the vagina, on account of the special epithelial lining of the latter, as has been demonstrated by Steinschneider and Eraud.

Gonorrheal metritis is often primary, while the specific vaginitis is the consequence, the latter condition being rather a desquamation or maceration than an inflammation proper. This, I repeat, is often the case, but not always so, for I have seen cases in which the vaginitis was certainly primary, and under proper treatment the uterus was not infected.

The cervix is the primary seat of infection of the uterus, and from this the gonococcus invades the remainder of the organ. The infection may remain for a long time localized in the cervix in an attenuated and latent state, and then after traumatism, fatigue or

labor, the infection lights up and quickly invades the entire organ, even extending to the tubes and peritoneum.

Noegerrath even went so far as to say that 75 per cent. of women infected with gonorrhea had endometritis and perimetritis following labor. Pozzi does not think this proportion too large if perimetritis be replaced by salpingitis. Sterility is a common consequence of this form of metritis and especially so if the adnexa are involved. However, gonorrheal endometritis is met with in pregnant women. It often begins before pregnancy, and the presence of the fecundated ovum in the cavity of the uterus, only aggravates the pre-existing inflammatory lesions; and Veit is even of the opinion that this always happens, the endometritis only showing itself for the first time during pregnancy, although it was there before this took place. But let me add that a healthy uterus can be infected during gestation, and this certainly does sometimes occur.

The pathological type that this form of metritis takes in pregnant women is, in the majority of cases, pyogenic; and there are also, perhaps, certain hyperplastic forms. Whatever this may be, it often interrupts the pregnancy, and Müller considers it a frequent cause of habitual abortion. Winckel believes that with the progress of the disease a similar pathological process takes place on the surface of the ovum, which results in rupture of the membranes.

Of all infectious diseases which complicate pregnancy, syphilis is the most important, especially on account of its great frequency. Its influence on gestation has been known for a long time, and it is exceptional that gestation goes on to term without some mishap. According to Blaise, the proportion of miscarriage and premature labor is 36.8 per cent.; while Legraud has found about the same, namely,

35.2 per cent.; in other words, about one miscarriage out of every three full-term pregnancies. Syphilis varies greatly in its effects, according to its age and whether the subject has followed a regular course of treatment or not. If the woman was syphilitic before conception, Fournier believes that she is more predisposed to miscarriage than if she contracted the disease during pregnancy. It is a fact that a large proportion of abortions follow a syphilis contracted before conception. In this case several miscarriages will succeed one another; but as the disease becomes attenuated, the fetus will develop to a greater age, and dies more and more late in gestation, and may even go to term, being born with or without syphilitic symptoms, and only die later.

It is also a fact that the severity of the syphilitic accidents and the abortions vary in an inverse relation to the age of the syphilis; but it is impossible to calculate how much time it will take for an untreated maternal syphilis to lose its effects on the ovum. If the subject becomes infected at the same time as conception the danger is about as great, and, as a rule, she will abort; but when the disease is contracted during gestation, and especially during the last three months, there is much less chance of the pregnancy being interrupted.

Syphilis in the father may not only infect the mother and through her the fetus, but may, although exceptionally, infect the child directly, as Fournier has observed; and in this case, if the mother contracts the affection, it will be from the fetus through the placental circulation. The majority of writers attribute the production of abortion in syphilis to the fetus. The syphilitic virus, whose nature is still unknown, passes from the mother to the fetus and infects it, while the serious organic lesions produced by the infection, death, maceration, finally produce its ex-

pulsion from the uterus. There are many cases of this kind, but I am of the opinion that they are not as common as those in which syphilis has produced lesions of the uterus. We have many cases on record of syphilitic metritis when there was no pregnancy, and I believe that when we shall have at our disposal the same means of diagnosis for syphilitic-metritis that we possess for the tubercular variety, recognition of the affection will become of ordinary occurrence. Bonnet records many cases of syphilitic metritis in his thesis, and even mentions some in which the subjects who had always had a normal uterus, were suddenly seized with an acute metritis at the time that the syphilis appeared. He concludes that these uterine symptoms met with in the very early stage of syphilis are the result of a characteristic anatomical lesion of the uterus, which develops by the presence of the general infection.

Secondary syphilis acts on the uterus in the same manner as on the liver, kidney and other viscera; and as the uterus is the principal organ of woman, and for that very reason is, like all active organs, subject to disease, it is one of the first to undergo the bad influence of this general infection. It becomes diseased and the symptoms of this anatomical change are leucorrhea, metrorrhagia and pain, symptoms which are not to be directly attributed to the syphilis, but to a well-developed metritis, which has been produced by the syphilitic infection. The case of a young syphilitic woman is recorded by Petit, who developed a typical endometritis during the secondary stage, while the genital organs presented no signs of specific accidents.

I have recently had a young married lady under my care, who consulted me for great pain and swelling in her nose. Another surgeon had told her she had polypus and advised removal. Not finding any polypus,

and after careful examination, I made the diagnosis of syphilitic necrosis of the bones of the nose and placed the patient on protiodide of mercury and iodol. She did so well that in ten days' time the lesions of the nasal bones had about disappeared. I then sent her to Schintznach in Switzerland for the summer. She returned in the fall perfectly free from any manifestation of the disease, when early last winter she developed as acute a type of metritis as you could wish to see. Under mercury and iodol internally and a little local treatment this metritis subsided, and according to my advice, the young lady is at present taking a cure at Luchon. Now, this patient who had been divorced some two years before she came to me, had never had any skin or other accidents until those of which I have spoken, and knowing the social position and reputation of my patient, I feel certain that the metritis in her case could have no other explanation than that of the tertiary form of a syphilis which she had contracted from her husband soon after their marriage.

Heitzmann believes that the proliferation of the internal lining of the vessels is a characteristic sign of syphilitic metritis.

Admitting that the non-pregnant uterus may be the seat of a syphilitic metritis, it will be all the more susceptible to this affection during pregnancy, which renders it a *locus minoris resistentiæ* in the true sense of the term. It is true that in order to prove this, we have no histological or bacteriological data, but there are clinical facts on which we can base this hypothesis. When the feticide action of syphilis is severe, when both parents are infected to a high degree, the fetus is generally killed by the syphilitic virus, and is expelled sometime afterwards in a macerated condition. In this case the endometritis is no longer a cause; it may even occur after the death of the fetus,

according to Duncan and others. But if, for example, the mother is alone infected, especially if syphilis was contracted after conception, and if pregnancy is troubled by pains, leucorrhea and slight hemorrhages, the fetus will come away living, and there will be a retention of the hypertrophied decidua with well marked changes in the decidua serotina. Here, gentlemen, I do not see how this condition of affairs can be explained in any other way than by a syphilitic endometritis.

Infection of the fetus and endometritis may also coexist, in which case pregnancy is interrupted, the fetus being expelled in a macerated state, and the hypertrophied placenta is retained. This hypertrophy of the placenta, which is so often related to endometritis of pregnancy, has been put forward by Pinard as symptomatic of syphilis; and I have seen this pathological condition in several syphilitic subjects whose children were born with evident syphilitic lesions, but this question will have to be studied, since as yet nothing is established regarding the histology of syphilitic placenta. The existence of primary genital tuberculosis is no longer doubted. In 1884 Fernet demonstrated it in women, showing its sexual origin following coitus with a tuberculous male. The tubes are most always the starting-point of tubercular lesions; but tuberculosis of the uterus is also known and it is a positive fact that it can be primary, following direct inoculation.

Pozzi considers it an infrequent disease, while Jouin and others believe that tubercular endometritis is more common than tuberculosis of any of the other genito-urinary mucosa, for the reason that the endometrium is soft, spongy and very rich in tubular glands, all of which conditions are especially favorable for the development of an essentially anërobic bacteria. The disease is, in the first stage, a

tubercular degeneration of the uterine mucosa, but the parenchyma of the organ may also be invaded.

There are two types of tubercular endometritis, one is of tubal origin or descending endometritis, the other is ascending and probably sexual in origin; the first type is by far the most frequent. The diagnosis has often been verified by microscopical examination and by the inoculation of guinea-pigs or rabbits. Sterility is very common as long as the tubercular inflammation exists in the mucosa, although Cooper mentions a case in which conception took place in a tuberculous uterus, the woman dying in the third month of gestation from a spontaneous rupture of the organ.

When endometritis or salpingo-endometritis occurs during pregnancy, abortion is nearly always unavoidable. The following case, due to Gusserow, is instructive. A woman was afflicted, after conception had taken place, with a descending salpingitis and a tubercular endometritis, and aborted at the fifth month. The post-partum was complicated by a puerperal infection and acute miliary tuberculosis, whose progress was found to be due to a thrombus derived from a large vessel in the uterine walls, in the centre of which was found Koch's bacillus.

Secondary tuberculosis is much more frequent, that is to say, a tuberculosis developing during a tubercular degeneration in some other organ, especially the lungs. You consequently can have a secondary tubercular endometritis in pulmonary tuberculosis, as well as a pulmonary infection following tuberculosis of the uterus and tubes.

We have recently had a case at this clinic of what I considered and diagnosed as tubercular salpingo-endometritis. The history is as follows: A. W., age twenty-one, married. She is a pale, thin and sickly-looking subject. Complains of pains between

the shoulders. Husband decidedly tuberculous. The patient coughs a good deal. Appetite poor, bowels irregular, tongue and mucosa pale, pulse-beat weak, 81 to the minute. No bladder symptoms. Sleeps well. Menstruated at fourteen, regular, no pain until married at seventeen, shortly after which menstruations ceased. First child three years ago, labor normal; second child sixteen months ago, precipitated labor, post-partum hemorrhage, and retained placenta which was removed manually. Since last labor the menses have not appeared. There is profuse leucorrhea, pain in left ovarian region, the latter rendering the patient incapable of doing anything. Examination of chest shows the heart to be small, while in both apices of the lungs fine crackling râles are heard; dulness of apices on percussion. Examination of the genital organs showed a lacerated perineum, uterus anteverted, slightly tender and enlarged, and rather bound down by adhesions, right adnexa apparently normal, left tube about the size of a small sausage and very tender.

Since the above notes were taken the patient has had a hemoptysis, and the lung symptoms are decidedly worse. In the case of this patient I would not like to say whether the tuberculosis of the organs of generation were the primary seat of the disease, from direct inoculation from the husband, or whether the infection was secondary to the lungs.

As to whether there is a secondary tubercular endometritis in phthisical pregnant women, or what part it plays in interrupting gestation, I am not prepared to say; but if it is found consecutively in the non-pregnant female, or primarily after conception, it appears to me that its existence is a well-founded possibility, and the case that I have just related seems to bear out this opinion. If it is present during pregnancy, I think it probable that it would not re-

main without influence in the production of abortion, although Lop thinks that tuberculosis does not fatally interrupt pregnancy, but that it is a continual menace for both mother and fetus. It is of common observation that as long as a phthisical woman remains in fairly good condition, pregnancy goes to term; but if the affection becomes worse, miscarriage is pretty certain to occur.

Intoxication of the organism is generally admitted to be the cause of miscarriage in these cases. As you know, Koch's bacillus, although it has been reported to have been found in the blood of the living, does not often invade this tissue, for I consider the blood as a tissue; it is the toxines secreted by the organism that do the harm. That the bacillus of tuberculosis can pass from mother to child is an established fact and Herrgott, of Nancy, demonstrated the tuberculous virulence of the amniotic fluid obtained from a phthisical woman.

The knowledge of the fact that various pathogenic organisms can pass from mother to fetus is a great scientific conquest, but there are various opinions regarding the part played by the placenta in this process. For many authorities, changes in the placenta are not considered as essential for the transmission of bacteria, and Chambrelent is of this opinion, for in his experiments on female rabbits he never found that organ pathologically altered, but Malvos believes that in order that a mother can directly inoculate the fetus with micro-organisms there must be a lesion of the placenta, while Schmorl and Birch-Hirschfeld found small granulations and Koch's bacilli in the placenta of tubercular guinea-pigs.

Last summer Charrin and Duclert reported a series of experiments, showing, on the one hand, that intoxication by the toxines, and, on the other, external poisonous material, as lead, mercury or substances de-

rived in certain cases from cellular life (as lactic acid) aid the passage of bacteria through the placenta in a variable degree. According to these writers, the glands which are often excellent fortresses are after a time destroyed by the secretions of the bacteria, as, for example, the kidneys, the organisms then penetrating, going from the capillaries into the tubuli, especially after the epithelial structures are deteriorated. And they conclude that at present they would say that the toxines act more on the cells of the organism than on the virus itself. Rémy examined the placenta of phthisical women who had had premature labors, and found their uterine surfaces whitish in color while there was a degeneration of the decidual cells.

Consequently, I think it safe to hold that in some cases tubercular endometritis is consecutive to a pulmonary infection, and may interrupt a pregnancy as well as producing lesions of the placenta, and by this means infecting the fetus.

Lecture III.

Gentlemen: In this lecture I shall study the metritis of infectious diseases as well as that produced by intoxications of the economy by lead, mercury, etc.

The question of infectious metritis is far from being settled, as many deny its existence, while others describe it as a special and undoubted form.

Massin used eighteen cases who died from general acute infectious processes, such as typhoid fever, relapsing fever, croupous pneumonia, etc., for the study of the pathological changes produced in the uterus by these infections. These consisted in a parenchymatous or interstitial inflammation of the mucosa and an interstitial inflammation of the muscular tissue. In all there was found an endometritis with hemorrhagic foci in the substance and on the surface of the mucosa,

and, according to the writer, the characteristic pathological change was a considerable afflux of blood to the uterus and venous stasis, in other words, the same changes as those found in other viscera in general acute infectious diseases. In some cases the venous stasis was the only thing abnormal, but in others there was extreme distention of the vessels with rupture of their walls, with resulting severe and numerous hemorrhages into the substance of the mucosa and muscular tissue of the uterus. The glands were also in a state of parenchymatous inflammation. The inflammation is sometimes diffuse, at others circumscribed, and appears to pass through three stages, namely: (*a*) Exaggerated afflux of blood to the uterus with venous stasis and vascular inflammation; (*b*) localized granular inflammation, consisting of a proliferation of round cells around vessels and glands; (*c*) diffusion of the inflammatory state.

Massin's studies corroborate the writings of Slavjanski on the hemorrhagic metritis of cholera; and they are so complete that after reading them, I am about convinced as to the possible existence of endometritis in acute infectious diseases.

I shall now proceed to discuss the question of metritis in acute infectious diseases occurring during pregnancy, and will begin with measles. When this disease appears in a pregnant woman, it will almost always bring about a miscarriage or premature labor. Underhill puts it at five times out of seven, while Klotz puts it at 75 per cent. The accident occurs at the time of the invasion of the disease or during the stage of eruption.

The cause of the interruption of gestation is difficult to explain, as the cough and dyspnea accompanying this pyrexia cannot be the factor, for the reason that there are other diseases, as pertussis, which have similar symptoms and in which pregnancy continues

normally. The fever cannot be considered as the cause; the experiments of Doléris and Doré show the error of the results given by Kaminsky and Runge, so that its action is only accessory, excepting cases in which the rise of temperature is sudden and high. Likewise it is impossible to admit that the same disease in the fetus as in the mother is always the cause of miscarriage, for the former is often born without showing any signs of the disease

For Charpentier, maternal toxemia is the cause; while for Vinay and others it is due to the action of the toxines elaborated by the agents of the infection. These toxines act either on the uterine muscle or on the nervous system, in the latter case producing contractions of the uterus.

Klotz admits that in measles, as in all other eruptive fevers, the miscarriage is the result of a simple exanthemic endometritis, which produces uterine contraction by a reflex action; a chronic metritis may also result.

Scarlet fever is very infrequent during gestation; but when it does occur, miscarriage is the rule. A case is reported by Hervieux, in which the affection appeared at the sixth month of pregnancy, and miscarriage took place on the second day of the eruption. The same factors have been put forward in scarlet fever as in measles; but in the former, death of the fetus is far more common.

Small-pox is one of the most serious complications of pregnancy for both mother and child, while varioloid is usually benign, but may give rise to miscarriage. Discrete small-pox produces miscarriage in about 50 per cent. of the cases, while in the confluent form this accident occurs in about 80 per cent. It is needless for me to say that the hemorrhagic form of this disease is usually fatal for both mother and child. Miscarriage occurs at different stages of small-pox, most

often at the end of the eruptive stage when the secondary fever of suppuration takes place. Richardière, who has observed three cases of miscarriage in small-pox patients, remarked that this took place during the stage of suppuration. Interruption of pregnancy depends on the severity of the disease and also on the time of gestation when it appears, the chances of its occurrence being far less when pregnancy is not far advanced. Death of the fetus is frequent; about 70 per cent. die. Among the many factors in the production of miscarriage during small-pox I may mention fever, medullary lesions, rachialgia, accumulation of carbonic acid or oxide of carbon in the blood, etc.; but these conditions usually only play a secondary part. The generally accepted cause is the infection of the maternal and fetal organisms; on the one hand, it is the disease and death of the fetus, while on the other, it is the action of the toxines on the uterine muscles or on the nervous centre controlling the contractions.

Other observers believe that miscarriage is due to intra-uterine hemorrhages, first described by Péchloir and afterwards by Serres, Spiegelberg and others. They occur in the decidua, and detach the membranes, resulting in the expulsion of the product of conception which, according to the given case, will be alive or dead. The greater part of modern pathologists deny the existence of hemorrhagic metritis in small-pox which has been searched for in vain at the autopsy, and it is generally believed that the hemorrhage is the result of the miscarriage. On this point I have little to say, but I do not see why hemorrhagic metritis is not possible in the disease under consideration, for in one epidemic the disease may not attack the genital organs while in another it may. Now, if endometritis be admitted as occurring in some cases of small-pox, it will be easy to understand the occurrence of metrorrhagia in the pregnant and non-pregnant woman, as

well as miscarriages taking place during the stage of intoxication and its disappearance. A table of 84 cases of small-pox during pregnancy is given by Costet, which shows that in a large number of cases miscarriage took place during the period of incubation or two months after recovery.

The pregnant female is not immune to typhoid fever, which may occur at any time during gestation. This disease produces miscarriage in about 66 per cent. of the cases. Sacquin found 199 miscarriages out of 310 cases, in other words, 64 per cent. The interruption of pregnancy can occur at all periods of the disease, but particularly during the second week.

The products of conception born before the seventh month of gestation are generally dead, poisoned by the Eberth bacillus, which is transmitted directly from the mother, as the experiments of Chantmess and Widal have demonstrated. Consequently the most frequent cause of miscarriage in this disease is the products of secretion and the pathogenic agent itself, which act at the same time on the fetus by killing it, and on the uterus by producing contractions. But for a long time it has been known that typhoid fever can produce congestion of the uterus, especially in the pregnant state. In the beginning a flooding may appear which is quite similar to the frequent symptom epistaxis, but later on the hemorrhage is *passive* in character and is made easy on account of the friability of the vessels. Duhaut believes that there is a plethora of the uterus under these conditions, which may be active or passive, and easily producing a detachment of the placenta with resulting miscarriage.

But beside these hemorrhages due to a simple afflux of blood, others are met with which are due to a primary inflammation of the endometrium; in other words, a typical hemorrhagic endometritis. Although Gusserow has never met this lesion in typhoid oc-

curring in the pregnant, he nevertheless admits its possibility, and states that the cause of hemorrhages is to be found in diseases of the endometrium; the pseudo-menstruation occurring in typhoid infection is to be explained in the same manner. Consequently hemorrhagic endometritis in typhoid fever during gestation or in the non-pregnant is still an hypothesis but has a considerable probability in its favor.

Cholera has a particularly bad influence on gestation, which is interrupted in more than 50 per cent. of cases, while women who do not abort during the course of this disease, usually die before the uterus has had time to empty itself. Death of the fetus takes place during the algid state or during the period of reaction. The cause of miscarriage in this disease, as in all others, has been interpreted in various ways. For some, death of the fetus is due to the loss of water which produces a decrease in the blood-pressure, having for result a diminution in the quantity of oxygen in the placental vessels, thus asphyxiating the product of conception. Others think that carbonic acid is in excess in the blood, which determines premature contractions of the uterus, while Queirel believes that it is the heavy black blood of the cyanic state that deprives the fetus of its normal hematosis.

According to the modern bacteriological researches, miscarriage in cholera, as in all other infectious diseases, is the result of intoxication of the maternal and fetal circulation by the bacillus of the disease, as well as its toxine. The well-known theory of Slavjanski should also be borne in mind. This observer, struck with the frequency of uterine hemorrhages during cholera, examined the cases in order to ascertain if these floodings were not a symptom of a pathological change, and the result was that he nearly always found lesions of the uterus. The decidua vera was very thick, soft and of a dark-violet color, and hem-

orrhagic foci, measuring as much as a centimetre and a half in diameter, were found in its substance. The decidua reflexa was also thick, but less so than the vera, and offered a few hemorrhagic foci not larger than millet seeds.

In pregnant women with cholera these changes are the cause of miscarriage, while in the non-pregnant, they cause hemorrhages. Let me add that this opinion has been attacked by many observers, particularly by Queirel, who never found a hemorrhagic endometritis in all his necropsies. However, these conscientious researches of Slavjanski remain as most instructive, and allow us, I think, to often attribute an abortion in cholera to hemorrhagic endometritis.

The action of influenza on the female genital organs is undoubted. In 1890, Müller gave statistics of 51 cases from which he concluded that this disease may produce metrorrhagia in the non-pregnant, characterized by its long duration and obstinacy to the usual therapeutic measures, while in the pregnant, miscarriage results. The experience of many others corroborates this view, and it is certain that the frequency of miscarriage and premature labor varies according to the severity of the epidemic. A third of Vinay's cases had a premature labor, and this is the result of the observations of others.

If, in other acute infectious diseases, the hypothesis of endometritis as a cause of miscarriage is attacked, there is certainly much reserve to be made in the case of influenza. According to Labadie-Lagrave, the hemorrhages in influenza are well explained by an acute inflammation of the mucosa; and what is more, taking into consideration the well-known influence of endometritis on miscarriage, the idea of an infection of the mucosa explains the occurrence of abortion and premature labor during *la grippe*. He thinks that it is difficult to admit a secondary infection, and believes

that it is more in keeping to attribute the cause to the pathogenic agent of *la grippe* itself. Vinay also believes in an inflammation of the decidua, but this lesion is far from being constant.

It is also quite possible that the specific bacteria produces a toxine which acts on the nervous centres or on the muscular fibres of the uterus; but if we find ourselves in presence of characteristic uterine symptoms, I believe we should attribute the miscarriage or premature labor, as the case may be, to an infectious endometritis, and if there are hemorrhages before the beginning of any symptom of labor, it is most probable, as is argued by Vinay, that there is an endometritis of the decidua.

Gottschalk examined the endometrium of a number of patients having metrorrhagia, and always found it inflamed and in a state of desquamation; and, according to this observer, the specific organism of influenza acts in the genital tract in the same manner as the gonococcus.

I have, gentlemen, studied with you the infectious diseases in which endometritis has been considered by many as the factor in the production of miscarriage, and perhaps it also plays a kind of part in other infectious maladies. It is very probable that sudamina (?) may produce metrorrhagia and deviation in the menses and miscarriage. As to lobar pneumonia, which is certainly a typical infectious disease, and which is sometimes accompanied by metrorrhagia according to Flatte, I have little to say. I have personally attended two pregnant women in this disease, and in neither was there any flooding during their illness; but in both, strange to relate, miscarriage occurred. In one it was six weeks after recovery; in the second, nearly two months after. Whether the interruption of gestation was due to the infectious process or not, I am not prepared to say.

You see, gentlemen, that acute infectious processes, especially certain ones, act directly on the uterine mucosa of pregnant women, and that this endometritis may cause miscarriage, the most frequently by hemorrhage, with resulting detachment of the ovum; but, as I have already remarked, I do not believe that an inflammation of the mucosa necessarily is present in every case of infectious disease and produces miscarriage.

The pathology of the latter depends on different conditions, such as the particular form taken by the given epidemic, the severity of the disease, the general conditions of the woman, and perhaps the manner of infection. It is impossible to attribute each and every miscarriage occurring during an infectious disease to the same mechanism or to the same agent producing the given infection.

In taking into consideration the modern theories of infection, we must remember a point often forgotten, namely, that infection of the organism may produce miscarriage, not only by the action of the bacteria and their toxines on the nervous centres or the muscular tissue of the uterus or the fetus itself, but also by their action on the cells of the uterine mucosa, producing the phenomena of inflammation.

As to intoxications by lead, mercury, sulphide of carbon, etc., their effects have long been known, but their manner of action is far from being understood. Of the intoxication by lead, or *saturnism*, I will say a few words. In 1860 Constantin Paul called attention to the influence of lead-intoxication of the parents on the product of conception, showing that it demonstrated its effects in many cases by death of the fetus and miscarriage; and out of 123 pregnancies he found 64 miscarriages. This fact is explained by the intoxication and death of the fetus on the one hand, while on

the other, we have the action of the metal on the uterus. But beside these causes, which are the most frequent, it is also a fact that an endometritis may develop under the influence of saturnism. Cases have been reported of women suffering from lead-intoxication who presented typical symptoms of an endometritis during pregnancy, the child being born alive; the membranes were thickened, the placenta hypertrophied, etc.

A case occurred in the service of Professor Tarnier, of a woman suffering from saturnism, who had in all probability an endometritis of pregnancy. She was delivered at the seventh month of a living child weighing 1,340 grammes, while the placenta weighed 480 grammes.

If the hypothesis of endometritis produced by saturnism be admitted, it would be easy to explain the metrorrhagia and sterility which result. However, I will not take your time in further argument of this question; but let me, in terminating this lecture, say that women who are employed in rubber manufactories, where sulphide of carbon is employed in the preparation of the goods, miscarry often, and sterility is frequent.

Lecture IV.

Gentlemen: In this lecture I propose to finish the subject of metritis as a cause of miscarriage; and in order to do so, I must consider the following points: the course of pregnancy complicated by metritis or endometritis, the mechanism of these abortions, the diagnosis, prognosis and treatment.

It is in no way a general rule that the symptoms of an endometritis are present during gestation. Sometimes the progress is perfectly normal and the preg-

nancy goes to term, and it is only after labor that the inflammatory changes are found in the placenta and membranes.

Pregnancy may go on undisturbed for a few months, when suddenly pains and hemorrhage appear, quickly followed by an abortion; in this case it is the decidua that will give a clue to the cause of the miscarriage. Generally speaking, endometritis of pregnancy will show its presence by various symptoms, these being principally the same as those of an endometritis of the non-pregnant organ, only they are more marked in the former. They differ according to the extent of the lesions of the mucosa and time of pregnancy at which they occur. Those that take place during the first six months will only be studied.

The most important and constant symptom is hemorrhage. Its origin is most varied. Usually when the vessels of the decidua serotina are inflamed, they become friable and rupture easily, thus bringing about a partial detachment of the placenta, while the blood, breaking its way between the decidua and wall of the uterus, appears.

If the inflammation of the mucosa is slight, the hemorrhage may be trifling and of short duration, without any symptoms, so that the patient pays little attention to it; but when the endometritis is more severe, hemorrhage is provoked by very slight causes, which in the healthy woman would be without effect, and they will persist or stop for a short time only to commence on the slightest occasion. The other symptoms are not long in showing themselves.

The blood of these hemorrhages is sometimes bright red and pure, but generally it is mixed with a watery fluid and vaginal or uterine secretions. Sudden and severe hemorrhage may occur, bringing about miscarriage more or less rapidly. This takes place in

endometritis following acute infections such as cholera, typhoid, small-pox, etc.; or they may occur in cases of old hemorrhagic metritis.

Leucorrhea is a nearly constant symptom. It may be overshadowed by the blood, but it exists here in some way or another, just the same as in a metritis in the non-gravid uterus. In passing, let me recall to your minds that leucorrhea is the exaggeration and morbid change of the normal secretion of the uterus.

Leaving aside the description of the watery, milky-colored vaginal leucorrhea, which has nothing to do with our subject, because it is the uterus that is affected, I shall simply describe the discharge from this organ. When it comes from the corpus it is a whitish-yellow and thick, while that from the cervix is usually gelatinous and whitish-yellow, sometimes greenish-yellow, and purulent, with an alkaline reaction. Occasionally the secretion from the cervix is only a liquid mucus, containing a few leucocytes; while in other specimens, although it may be viscid and transparent, it is, nevertheless, virulent, and may contain gonococci. Leucorrhea varies greatly as to quantity, and is generally not continuous. I do not mean that the secretion is not constant, but the product of this secretion is only evacuated at intervals. It accumulates first in the vagina, and escapes from time to time in small quantity from the vulva.

Hydrorrhea is a colorless liquid discharge; it is clear, slightly viscid, sometimes tinted pink, and of a gummy consistency. The spots produced by this discharge are sometimes almost invisible, at others they are pinkish with a darker border. The principal characteristic of hydrorrhea is its manner of appearing which is by a sudden profuse flooding of watery fluid coming on without any apparent cause. When the quantity exceeds 300 grammes, the hydrorrhea

may be preceded by an increase in the size of the uterus, which is discovered by palpation, and the patient may also complain of a sensation of tension and weight, which will disappear after the liquid has come away.

This discharge from the genital organs, which usually appears in the midst of apparently perfect health, may not occur again, and does not produce any serious trouble. However, it is not uncommon for the discharge to appear at irregular or regular intervals. Sometimes the floodings succeed one another with increasing frequency; at others they come on at intervals farther and farther apart. The quantity of the discharge varies in different cases, increases or diminishes. Between the intermittent jets there is usually no discharge, although this is not always so. In a case reported by Roy the hydrorrhea was first colorless and then became bloody, appearing at rather long intervals for two months and a half. In a case reported by Zielinski, the patient had four watery discharges, which were preceded by lumbar and abdominal pains; this discharge became pink and later red.

Pains may accompany the above symptoms, or come on alone, being the only symptom of an inflammation of the mucosa. Their type varies. If they accompany a slight hemorrhage, they do not amount to much; but if they occur during a serious flooding, they are intense and increase as the time of expulsion approaches.

Ordinarily, hydrorrhea is accompanied by a malaise and disagreeable sensations in the pelvis. The accompanying pains vary in different subjects, according to the susceptibility of the nervous system. The subjective symptoms are sometimes so slight as to pass unnoticed; at others they are marked by continuous or intermittent pains in the pelvis and hypogastric

regions, extending down towards the sacrum and upper part of the thighs. When severe, the subject has difficulty in walking, etc.

The origin of the pains is in the uterus, but their seat may be in different parts of the body. The hypothetical rheumatism of the uterus has also been put forward to explain the pain.

It is impossible to diagnose the type of endometritis from the character and seat of the pain; and it is likewise difficult to explain the cause, although Veit thinks that perhaps they might be attributed to small hemorrhages in the decidua which are slowly undergoing resorption, as well as to small inflammatory foci.

Endometritis may finally produce a rupture of the membranes, because the inflammation of the decidua causes the chorion and amnios to become so thin and friable that when even a slight traumatism is inflicted, such as a little jar, going from one room to another, it may result in their rupture. Other symptoms of endometritis often precede the rupture of the membranes, although exceptionally, this accident is the first indication of the disease.

Now, if you examine the uterus of a pregnant woman with endometritis, you will generally not find any distinct signs. Frequently its size does not correspond to the age of pregnancy; it will be larger. Sometimes it changes in dimensions; for example, after the liquid of an hydrorrhea has been expelled, it decreases, and the walls which were distended become soft and are easier to palpate. *Per vaginam*, the lower segment of the organ may perhaps be found thickened and inflamed, rendering the fetal parts imperceptible to the examining finger. Palpation or vaginal examination may cause considerable pain for the patient, the least pressure on the abdomen, cervix or inferior segment of the uterus produces suffering.

By the speculum, beside erosions, lacerations, etc., you will sometimes be able to see characteristic ulcerations having a fungoid appearance and a crater-like depression. These lesions alone, which were present before pregnancy, are a danger, not directly in themselves, but because they are often the indication of similar inflammatory lesions in the corpus uteri.

As parenchymatous metritis is very often accompanied by an endometritis, the symptoms of the inflamed mucosa may often be present. On the other hand, if the parenchymatous metritis is of long standing, the endometritis may have disappeared and left behind only such traces as partial sclerosis or a few indurated points. In this case the leucorrhea, hydrorrhea and hemorrhage may be wanting. There is one symptom, however, which is never absent, and that is pain. This may be more severe than in any other type of metritis, and is explained by the extreme distention of the uterus.

By a very careful examination of the uterus *per vaginam* you may sometimes feel an induration of the walls of the organ; but, I repeat, this condition is rarely discovered.

The most characteristic symptom of an inflammatory condition of the mucosa is to be found in the antecedents of the patient when she tells you that she often aborts and that the accident usually takes place at about the same period of gestation.

The progress of a miscarriage due to an endometritis is about the same as in miscarriage from any other cause.

There are two signs worth remembering, to which I wish to call your attention. In the case of a fetus directly poisoned by the specific organism and toxines of any of the acute infectious diseases, *it first dies and is then expelled*, while in endometritis it is *expelled*

alive in the larger number of cases. There are, of course, many exceptions, and I have pointed out to you that a diseased decidua will produce nutritive troubles in the ovum resulting in its death.

Another sign of miscarriage produced by endometritis is the retention of the placenta and membranes. This may occur in any abortion, especially those which take place during the third and fourth months, because the connections between the uterus and placental tissues are intimate. But if the decidua is inflamed, in which case many of the glands are destroyed and their place occupied by connective or even fibrous tissue, adhesion of the membranes and placenta are quite frequent.

The latter organ is only infrequently completely adherent, but if so, it may be retained in the uterine cavity for many months without giving rise to any symptoms. It finally undergoes a granulo-fatty degeneration, then sclerosis, and is at last spontaneously or artificially delivered.

Partial adhesion is far more frequent. Sometimes the placenta is partly detached and partly adherent, in which case two of the most serious complications occur, namely, hemorrhage and septicemia. At other times the placenta is only partly expelled, and the remaining part is found adhering to the uterine walls. This latter may be quite considerable in extent and give rise to no symptom up to the time that it is expelled, but when it becomes detached hemorrhages are wont to appear.

In other cases you may have a very small piece of placenta adhering intimately to the walls, and this may also remain for a relatively long period in the uterine cavity. This very adherent placental *débris* may produce hemorrhages which are sometimes most serious, and have been denominated *deciduoma*.

The diagnosis of puerperal endometritis is in most cases very difficult to make, and the only positive pathological sign is an inflammation of the decidua. It consequently is only after abortion has taken place that the diagnosis is made; but in some cases shreds of the decidua are expelled, and after a microscopical examination the inflammatory process going on in utero may be suspected.

But unfortunately these favorable cases for diagnosis are infrequent, and you will have to content yourselves with the symptoms which are far from being characteristic. Consequently you should proceed to make a differential diagnosis in a most careful manner.

In the first place the patient's antecedents regarding the menses, pregnancies, labors and post-partum period should be carefully inquired into, as you know the great value of some knowledge on these points; and especially is this true in cases of endometritis. If you find that the former pregnancies were interrupted, if the labors were complicated by placenta previa or retention of the afterbirth, if the decidua was thick, all these facts will help you in your diagnosis, because they all can be produced by an endometritis.

Now, if you learn that your patient was infected during her last labor, or post-partum, or if she has gonorrhea, syphilis, or an acute infectious process, if she has suffered for some time with a metritis, why then your diagnosis becomes easier to make.

It now remains for me to say a few words regarding the actual symptoms of the affection. Intermittent hemorrhages produced by a slight cause are to be especially noted; their particular point is their repetition for several weeks before miscarriage up to the time this takes place. But you must not forget that you may have to deal with some heart lesions, fibroids

or cancer of the uterus or cervix, varicosed veins of the external genitals, placenta previa, albuminuria, traumatism, etc., all of which may have hemorrhage for a symptom; and you must eliminate these. You should always examine the general health of a pregnant woman, the condition of all her viscera, and above all, the internal and external genital organs, not forgetting to examine the *odor* of the blood passed (if this occurs) as well as the quantity and frequency.

Leucorrhea which is very common, must be examined to ascertain if it be vaginal or uterine; in the latter case if it comes from the corpus or cervix, or if it is simply due to a defect in the general nutrition from anemia or chlorosis.

A watery discharge should be carefully looked to, as its origin is most important to ascertain. Do not forget that a *thin watery and nearly odorless discharge* may be due to a commencing carcinoma uteri.

If it is the amniotic fluid and if the ovum has ruptured, the walls of the uterus will be found retracted on the fetus, which will be slightly immovable on account of this pressure. An intra-cervical digital examination, by displacing the fetus, will give rise to the appearance of a serous liquid in which lanugo and sebaceous magna will be found; the liquid will trickle away slowly but continuously.

The characters of decidual hydrorrhea are different in every respect; the amniotic pouch is closed and in spite of the watery discharge distinct ballottement can be produced. Occasionally the discharge is only an involuntary emission of urine or the elimination of leucorrhea which has accumulated in the vagina; but here the nature and odor of the liquid is quite sufficient to prevent an error in diagnosis.

You must be guarded in your opinion as to the pains which will be complained of by your patients,

because the description given is usually far from clear. Women usually give you the impression that they are suffering from nephritic or hepatic colic, gastralgia, cancer or neuralgia; so I again warn you not to base your diagnosis on the symptom of pain alone, for generally you will be terribly deceived. Do not forget to note whether the pains are accompanied by uterine contractions, thus announcing approaching labor.

Let me impress upon you the fact that *not one symptom taken alone* will justify you to make a diagnosis; it is only when you have *all the symptoms, plus a history of the last pregnancy and antecedents of the patient*, that you can feel that you have a rather complete picture of puerperal endometritis.

The prognosis for the mother in this form of endometritis, depends on her general condition, the severity of the disease and its cause. You will easily understand that the hemorrhagic variety, which is encountered in the acute infectious diseases, is far more serious than old chronic endometritis with its slight losses of blood or watery discharges, which have little effect on the health of the woman. As a matter of fact there is a great difference in the prognosis of an inflammation of the mucosa in a strong healthy woman and a subject already exhausted from chlorosis or tuberculosis.

You should always have in mind two possible complications, namely, ante-partum hemorrhage and the retention of the membranes or placenta. The hemorrhage may be so considerable as to endanger the life of the patient and the blood is sometimes so fluid that it flows in great quantity, while in other cases clots form and accumulate in the vagina, acting like a tamponade.

A hemorrhage, as you are aware, gives rise to quite marked general symptoms, pallor of the teguments,

small bounding pulse, tinnitus aurium, troubles of sight, etc., while there is also often a tendency to syncope.

A retention of the membranes or placenta will also render your prognosis more sombre, because this condition may be the cause of a post-partum hemorrhage or even septicemia.

A post-partum hemorrhage is either continuous or intermittent, profuse or slight. It takes place soon after the expulsion of the product of conception, but may, although infrequently, occur from ten to thirty-five hours after. In the first instance it is produced on account of the retained *débris* preventing the uterus from firmly contracting upon itself; while in the second it is due to the tardy detachment of the retained mass, which leaves the uterine vessels largely opened. This loss of blood is not always an immediate danger for the patient, but it produces a most serious anemia, which will only be overcome by a long and well-directed medical treatment and cleaning the uterus out.

Septicemia comes on a short time after if abortion occurs, as the uterus remains half opened for the exit of blood, and the infection is thus able to have easy access to the interior of the organ. If the placenta is partially detached, thus having its blood-supply in part cut off, putrefaction takes place from the contact of air, and it consequently becomes a source of infection. Septicemia is often produced by unclean hands employed in a vaginal examination, or by faulty asepsis of instruments, dressings, etc.

Septicemia will very often leave behind serious lesions of the uterus or adnexa. Do not forget this; and if you have the misfortune to treat a case of this kind, do your work thoroughly, and in so doing you will probably prevent a salpingitis and peritonitis.

Occasionally the fever persists, the chills come

back, and the patient dies from the progress of a putrid infection; but there are also cases in which the symptoms of auto-infection suddenly disappear after a spontaneous or instrumental elimination of the placental *débris*.

When the membranes alone are retained, hemorrhage and infection are far more infrequent.

The retained remains of the placenta or decidua adhering to the uterine walls may enter into the formation of a deciduoma, which is a source of very severe hemorrhages. Küstner states that a retained decidua and chorion may give rise to a malignant deciduoma, which statement has been corroborated by Mové-Josséraud, Lacroix, and Jeannel and Bacon.

As to the treatment, I may say at once that it is very difficult to treat an endometritis as long as pregnancy is going on. The only good practice is the preventive treatment which is undertaken when the uterine cavity is empty in cases in which an inflammation of the uterine mucosa has occurred before the pregnancy or when it has already produced miscarriages.

There are to-day many recorded cases of women who had aborted several times and who became pregnant after a cure of the endometritis had been obtained, and went normally to term.

The treatment applied to endometritis has been most varied, but there is no doubt but that a well-conducted curettement of the uterine cavity is the best and most proper method. It is generally accepted that after removal of the mucosa by the curette, this will be reproduced in such a way that a normal conception and pregnancy will take place; but it is difficult to indicate with certainty at what time the endometrium will have become really apt for this new function.

It is generally believed that the first menses after curettement is a proof of a cure of the endometritis and as indicating the presence of a healthy mucosa. There are, however, cases which plainly show that although all symptoms of inflammation of the mucosa have disappeared and the menses are normal, the endometrium is not in a condition which will allow the ovum to develop.

When the endometritis is dependent on a general infection, a general treatment must be instituted; for example, mercury in syphilis.

Preventive treatment is often crowned by success in cases of parenchymatous metritis; but here curettement is rarely indicated, and will do little, if any, good when performed. If there are indurations in the walls of the uterus which are due to old inflammatory exudation, I would strongly advise a course of massage, which will give most excellent results; but on the condition that it is properly and scientifically done. Those of you who are desirous of possessing an idea of the technique of massage of the female genital organs will do well to read my translation of two lectures on the subject by my esteemed teacher, Professor Vulliet, and which was published in the *Annals of Gynæcology and Pædiatry* in 1890.

When you are in presence of a hemorrhage or uterine pains, the preventive treatment of abortion in general should be the one of choice. This consists of a quiet in bed, enemas of laudanum or chloral hydrate, hyperdermic injections of morphine, etc. But if abortion is threatening, you must not hesitate to act immediately; and for the hemorrhage a well-applied vaginal tamponade, with iodoform gauze, should be practised.

Now, if miscarriage is inevitable, either because the death of the fetus is certain or because the membranes

have ruptured, you should not delay the expulsion of the ovum. All that is necessary under the circumstances is to irrigate the vagina thoroughly with a one-per-cent. solution of sulpho-naphthol or some other good antiseptic, and have before your minds that *a miscarriage demands more strict antisepsis and more care than a normal labor.*

When the placenta or membranes are retained, I think it advisable to remove them with a dull Rheinstædter curette, but do not forget that the *walls of the uterus after labor are thin and easily — yes, very easily — perforated by your instrument*, a complication that you all want to avoid. After you have removed the retained *débris*, a hot intra-uterine irrigation should be given, and the cavity packed with iodoform or europhen gauze.

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